

falls in the mountains during April or May can not be depended on to supply water for late summer irrigation, and the stock of snow which fell in the mountains last April melted very early in the summer, due to the usually warm weather of May and June, the temperature for the two months in the State averaging from 4° to 6° per day above the normal.

The precipitation during May, June, and August, was very deficient throughout the State, and during July it was but slightly in excess of the normal. Of the ten months, six were decidedly deficient in precipitation, three months but slightly in excess of the normal, and but one month, April, had a decided excess.

It might be remarked in this connection that the season in Wyoming was a fairly successful one to the agriculturist, as the heavy precipitation of April was especially favorable to the meadows of the State, and despite the adverse conditions of May and June, a crop of hay probably in excess of the average was harvested; it may be safely said that the value of the hay crop, native and alfalfa, exceeds that of all other agricultural and garden products raised in this State at present.

At the close of the months of January, February, and March, 1900, special snowfall bulletins, based on reports of reliable correspondents in various portions of the State, were issued from the Weather Bureau office at Cheyenne. These bulletins showed that much less snow than usual had accumulated in the mountains in nearly all portions of the State. In the report issued about the 10th of April it was predicted that a flow of water less than the usual would prevail in the streams of the State during the summer. Owing to the very small stock of snow in the Big Horn Mountains, it was predicted that a decided shortage of water would occur in the streams on the eastern slope of the Big Horn Mountains; this prediction was fully verified, for by the last of June water was very low at Sheridan, and only the early appropriators could secure water for irrigation; by July 6 low water was reached at Parkman, Sheridan County; on August 15 the Powder River at Griggs was the lowest it had been for years. Owing to the light snowfall of the winter and continued dry weather in early summer, the streams of the Green River watershed dried up very early in summer. Over the Laramie and Platte watershed, where a fair stock of snow existed at the close of March, as shown by the snowfall bulletin for that month, the flow of water in the streams was maintained much later than in other sections, although the amount of water was less than usual in nearly all the streams of the State. The gaging station, maintained by the United States Geological Survey, at Woods on the Laramie, a station above nearly all of the ditches on that stream, showed that high water was reached as early as May 30, 1900, while during 1899 high water was not reached till June 25; the flow of water at that station in August, 1900, was much less than the flow in September, 1899.

The interest and value of these monthly snowfall bulletins has been such that the Chief of Bureau has authorized their issue for Wyoming during the coming winter, when it is hoped to make them of even more interest and value than during the past winter. It is expected that special snowfall bulletins for Wyoming will be issued at the close of the months of December, January, February, and March.

TORNADOES IN TENNESSEE, MISSISSIPPI, AND ARKANSAS.

By S. C. EMERY, Local Forecast Official, dated November 20, 1900.

During the afternoon and evening of November 20, 1900, the section of country embracing southeastern Arkansas, northern Mississippi, and western Tennessee was visited by

at least six distinct tornadoes, all of which were destructive and exhibited the usual characteristics of such storms. All moved in exactly the same direction in parallel lines, with a rate of progressive motion of from 45 to 60 miles an hour, as shown in fig. 3.

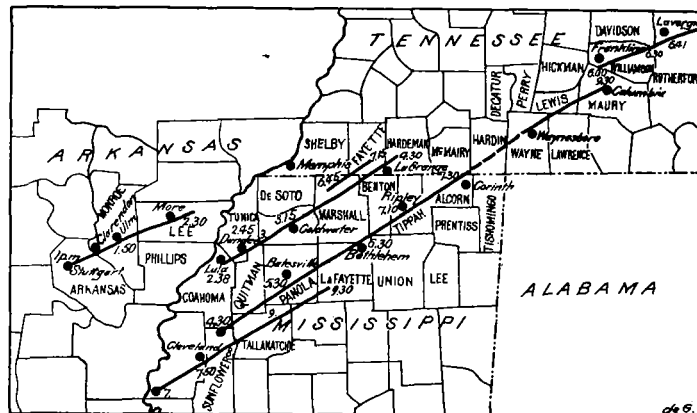


FIG. 3.—Tracks of tornadoes, November 20, 1900.

Some portions of the country through which the tornadoes moved are thickly settled, and as everything within the limits of their narrow paths was destroyed, the loss of life and property was very severe. The actual deaths resulting from these storms number at least seventy-three, while a large number of persons were seriously injured and a much greater number rendered homeless by the destruction of their dwellings. Through the farming districts the loss was mainly confined to fences, farm buildings, and negro cabins, a great number of the latter being carried completely away. Unpicked cotton was stripped from the stalk and scattered broadcast over the country, and instances were noted where large quantities of cotton were carried by the tornado to distant forests and deposited upon trees making them appear to be covered with snow.

Correspondents along the tracks of the storms report a funnel-shaped cloud; some liken its appearance to a balloon, others to a haystack, while some speak of it as a very black or greenish cloud with a small twisting end touching the earth. In some places the cloud appeared as a great ball of fire, and at others small balls of fire shot out of the lower portion of the cloud. The most notable feature, and the one mentioned by all who observed the storms, was the intense and constant lightning, the extreme brilliancy of which in some cases turned night into day. The noise attending the passage of the storm cloud is generally described as a deep roar like the moving of many railway trains, which could be heard for some time before the storm arrived. The warning thus given enabled many to seek places of greater safety and was the means of saving life. Hail is reported in only one or two instances. Generally, after the tornado had passed, heavy rain set in which continued for some time.

One fact worthy of note is that through the low, timbered sections the path of destruction was much narrower than over the high ground, though in both cases there appears to have been nothing in the way of buildings or trees sufficient to resist the wind. The weather conditions during the morning of November 20, throughout the section affected, were exceedingly threatening. Temperature was abnormally high for the season, air close and sultry, and for several hours a general feeling of oppression prevailed. Frequent showers of short duration occurred, usually accompanied by thunder and sudden gusts of wind. Heavy rain would start in and continue for five minutes or less, and then end as abruptly as it began. Wind fresh from south and southwest until about noon, when it died down to nearly a calm. The barometer at Memphis, Tenn., rose slightly during the morning, but

about noon a rapid fall set in which continued until 3 p. m.; this was followed by a sharp rise, and this again by a quick turn downward until about 7 p. m. The temperature rose steadily from 8 p. m. of the 19th to 9 a. m. of the 20th. At 10 a. m. of the 20th the temperature fell 5° and then rose rapidly again to a maximum of 74° at 2 p. m., when a fall of 10° occurred within a few moments and continued to fall more slowly until 7 p. m., when it reached the minimum, 63°.

The first tornado reported originated in eastern Arkansas, probably in Arkansas County, and moving northeast, passed about 5 miles south of the town of Stuttgart, in that county, at 1 p. m. It kept its northeasterly course through Monroe and Lee counties, when upon reaching a high ridge bordering the St. Francis Basin on the west, known as Crowleys Ridge, the tornado left the earth and was seen no more. It is possible, however, it may have continued its course and passed over the City of Memphis, Tenn., at a considerable height about 3 p. m., as there was great agitation in the clouds at that time and the meteorological instruments indicated a serious disturbance near by. The greatest damage wrought by the Arkansas tornado was in Monroe and Lee counties. Its path throughout was strewn with wrecked houses and other buildings, but fortunately the list of fatalities is small. About 6 miles north of Stuttgart, near Ulm, Ark., several dwellings were destroyed and 2 persons killed. The town of Moro, in Lee County, 14 miles northwest, was almost entirely swept away, only 4 buildings left standing; 1 white child was killed and its mother seriously injured; 2 negroes were also killed. Total number killed in Arkansas, 6. The tornado traveled 45 miles in one hour and fifteen minutes.

Tornado No. 2 started in the vicinity of Moon Lake, in Coahoma County, Miss., and passed near the town of Lulu, Miss., about 2.30 p. m., and through Dundee, Miss., at 2:45 p. m. From Dundee the tornado took a northeast course and passing through the counties of Tunica, Tate, Marshall, and the northwest corner of Benton, reaching the Tennessee line not far from Michigan City. It then passed through a portion of Lagrange, Tenn., and disappeared from view.

The destructive character of this storm was first felt near the town of Dundee, Miss., on the farm of Mr. F. M. Norfleet, of this place. On this farm 6 persons were killed, many buildings destroyed, great damage done to fences and unpicked cotton. From Dundee to Arkabulta, Miss., the storm track was marked by wrecked buildings, fallen trees, and general desolation; 8 white persons and 1 negro were killed. Arkadelphia, Miss., is a town of about 1,000 inhabitants and scarcely one of them escaped injury. Hundreds of homes were swept away without warning, and 11 persons were killed and a very large number severely injured. Continuing its northeasterly course the tornado reached Strayhorn, Miss., at about 3 p. m., killing 11 people, and Coldwater, Miss., at 3.15 p. m., where 1 person was killed and much valuable property destroyed. The next town visited was Guys Switch, a small settlement about 1 mile south of Love Station, in Tate County, reaching that place at 3:20 p. m., and demolishing 10 or 12 buildings, among which was the big sawmill plant of J. Guy & Co. Mr. Guy reports as follows regarding the storm at his place:

We were running a sawmill at the time and did not notice the approach of the storm until within a few yards of us. The destructive part of the storm lasted about five or ten minutes. There were 23 men in the mill at the time, and though it was completely demolished no one was hurt. The storm was moving northeast with a path, I think, about 500 yards wide. It passed my place and swept everything before it. There was no hail, very little thunder and lightning, and no rain until the storm had passed. The trees outside of the storm's path lay mostly with their tops toward the center of the track of greatest destruction. The cloud was funnel shaped, and when it came in contact with the ground flattened out, and as it rose became narrower. One man was killed and several badly hurt by flying and falling lumber.

From the accompanying diagram it would appear that the

tornado at Guys Switch either divided and the two parts traveled in nearly parallel lines for a mile or two and then became united, or else the zig zag motion noted at many places was unusually pronounced in this case, and it bounded over the uninjured buildings. I am inclined to believe the latter explanation the more reasonable.

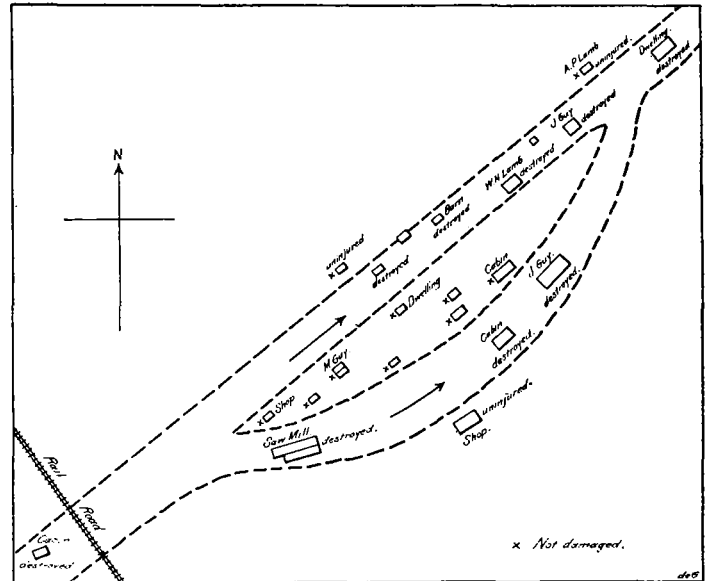


FIG. 4.—Tornado at Guys Switch, Tate County, Miss., November 20, 1900, at 3:20 p. m.

The next important town visited by this tornado was Lagrange, Tenn., where it arrived at 4:30 p. m. and destroyed about 20 buildings and caused the death of 2 persons. The property loss at this place aggregates \$50,000. Within a path 175 yards wide practically every building was leveled to the ground. After leaving Lagrange the tornado traveled but a short distance and then disappeared. Total distance traveled by the tornado from Dundee to Lagrange, 80 miles; time, one hour and fifty minutes, an average rate of movement of about 60 miles an hour.

Mr. W. E. Darby, of Lagrange, Tenn., furnishes the following in regard to the tornado as he observed it.

Destruction began 4:30 p. m. and ended five minutes later. Destructive period at any one point was not over thirty seconds. Storm moved northeast by east. Width of path of greatest destruction, 175 yards. Thunder and lightning severe. Cloud was funnel-shaped, and from appearance of debris, etc., the whirl must have been from left to right. Buildings destroyed, 20 in all, mostly frame. Appearance of storm, greenish looking cloud in the southwest, with black cloud, gray below, in the west; both seemed to be approaching us in advance of the storm, sharp lightning in each. Wind light from the east. Occasional light showers preceded the storm and continued up to the time of its arrival. Just before the storm broke there was nearly a perfect calm and a deathly stillness prevailed for several minutes. This was followed by a deep roar like the muffled sound of heavy rain falling on a distant tin roof, increasing to a roar such as might be produced by a thousand railway trains. When the roar was first heard the green and black clouds had disappeared, and the southwest sky became a heavy leaden gray, with the appearance of heavy rain falling. This seemed to melt away like vapor, or to be drawn aside as a curtain, while from beneath and beyond there came bounding and leaping into sight like a thing of life, the tornado cloud. Black as night, edged with white, all motion and confusion. It looked much like the dense smoke just breaking through the roof of a burning building. It came on very rapidly, increasing in size, and filling the air with flying debris. No hail; gradual fall in temperature after the storm, but not over 10° in all. Immediately after the storm rain fell in torrents for about an hour. Observed all this from the street directly in the track of the storm and only saved myself by running.

A strange relic left by the storm at Lagrange was a tin sign bearing the inscription "Johnson Bros., Lula, Miss." evidently brought by the tornado from that place more than 80 miles distant. From a frame house on Main street was extracted a small piece of rotten wood which was driven half through

a heavy oak plank, despite the fact that the flying splinter was so decayed that it crumbled while being drawn out. The Methodist church was destroyed in an even more singular manner. Each of the four walls fell inward, forming a succession of layers, one on top of the other, and all surmounted by the steeple. The cyclone wind, after the roof had been taken away, evidently formed a vacuum inside the church, which resulted in all the walls closing in.

Tornado No. 3 started about 25 miles south of No. 2 in the northern portion of Sunflower County, Miss., passing 6 miles south of the town of Sumner, Tallahatchie County, at about 4:30 p. m.; moved northeast through the counties of Tallahatchie, Panola, Lafayette, touching the southern portion of Marshall and Benton, through Tippah and Alcorn, and passing into Tennessee just north of Corinth. In its movement northeastward from Sunflower County, the storm passed near Batesville at 5:30 p. m., doing only slight damage. From there it seems to have touched the earth only occasionally, passing over Abbeville, and striking the earth again near the town of Bethlehem in Marshall County at 6:30 p. m., where it destroyed 3 buildings, and passed on to Tacaleeche, Benton County, wrecking two or three small dwellings about 6:45 p. m. It reached Ripley, Tippah County, at 7:10 p. m. Its track at this place was about 200 yards wide, and within 7 miles of town at least 25 dwellings were destroyed and a large number of people injured, but none are reported killed. From Ripley the storm passed through a fine farming district destroying many dwellings and other property. The next point of attack was Corinth, Alcorn County, where it arrived at 7:30 p. m., but as it passed to the south of the town no fatalities occurred, and the damage was mostly confined to negro cabins, many being blown away. The distance from the point of starting to Corinth is about 125 miles; time, three hours and thirty minutes.

After entering Tennessee the storm's track was through a section of country from which it is difficult to obtain even meager information, but it is known to have continued its course to the northeast, and entering the southeastern portion of Maury County, reached Columbia two hours after leaving Mississippi, or at 9:30 p. m. The tornado passed through the suburbs of Columbia in a northeasterly direction, sweeping a path from 100 to 300 yards wide and destroying everything within its reach; 27 persons were killed and between 60 and 70 more or less injured. About 50 dwellings were destroyed, and the loss in buildings alone is estimated at \$30,000. A settlement near Columbia, known as Macedonia, about 2 miles from the original striking point of the tornado, containing about 25 houses, was completely

demolished, and 13 people were buried under the debris. After leaving Columbia the tornado cloud disappeared. Total distance traveled, 215 miles; time, five hours and thirty minutes.

Tornado No. 4 started about 6 p. m. in Williamson County, Tenn., a few miles south of Franklin; it passed through the town of Clovercroft, and struck Nolansville at 6:30 p. m., where 3 persons were killed and about 13 buildings destroyed. Passed through Lavergne, in the southeast corner of Davidson County, at 6:41 p. m., killing 2 persons and demolishing 25 buildings. As I have not been able to trace this storm beyond Lavergne it is probable it left the earth at that point. Distance traveled, about 25 miles.

Tornado No. 5 probably had its origin in the extreme southeastern portion of Arkansas, but first came into notice not far from the town of Huntington, Bolivar County, Miss., at 7 p. m. In the vicinity of Huntington 10 buildings were destroyed and about 20 persons injured. From Huntington the storm moved northeast and reached Cleveland in the same county at 7:50 p. m., wrecking a number of houses on the Sparkman and Coleman plantations, and injuring a number of people. From Cleveland the storm passed through Sunflower and Tallahatchie counties, a few miles south of the path taken by No. 3, and disappeared near the town of Reynolds in the southeastern corner of Panola County, Miss., at 9:30 p. m. Distance traveled, 95 miles; time, two hours and thirty minutes, or about 40 miles an hour.

Tornado No. 6 started in Marshall County near the town of Coyce, and, moving northeast, struck the town of Tracy, completely demolishing the two-story residence of Mr. J. B. Higgins, sweeping it entirely away, also the brick office of Dr. Berkley, as well as the frame store of Mr. Walker. Leaving Tracy it next visited the little town of Vance, located in the northern edge of Marshall County, where a general store and 10 cabins were destroyed and 3 children killed. The tornado then passed into Tennessee, and reached Moscow, Fayette County, at 7:15 p. m. Here it destroyed the residence of Mr. J. Owens, seriously injuring the inmates, and also demolished several farm houses in the vicinity. This storm was distinctly seen at Collierville, Tenn., and also from Memphis. Distance traveled, 24 miles; time, about 30 minutes.

Besides the tornadoes above noted, two occurred in northern Alabama, one between 6 and 7 p. m., and the other during the early morning of November 21.

The money value of the property destroyed by these tornadoes can not be accurately known, but it is certainly not less than half a million dollars.

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Professor of Meteorology.

CHARACTERISTICS OF THE WEATHER FOR NOVEMBER.

The weather of November, 1900, was rather stormy, in marked contrast to that of October, 1900. The area of high pressure over the eastern seaboard, which has been so marked a feature in the pressure distribution of the last four months, gave way early in the month and areas of high pressure began again to move in a southeasterly direction.

The temperature was generally above normal, except in the upper Mississippi Valley and in the extreme northwest, where the average daily negative departure was from 3° to 6°. Heavy snows occurred in the northern Rocky Mountain districts

during the 20th and 21st, but the snowfall elsewhere was comparatively light.

A series of tornadoes occurred in southeastern Arkansas, northern Mississippi, and western and middle Tennessee on the 20th, a special report of which appears elsewhere in this REVIEW.

The distinguishing characteristics of the month were (1) the breaking up of the area of high pressure over the eastern seaboard, (2) a movement of the highs southeastward, and (3) the occurrence of severe tornadoes in the middle Mississippi Valley.